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RST-04720R (March 2003)

Superseding
RST-04720R (April 2002)

RESERVE SUPPORT TEAM GUIDE SPECIFICATIONS

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SECTION TABLE OF CONTENTS

DIVISION 04 - MASONRY

SECTION 04720

CAST STONE

03/03

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RST-04720R (March 2003)
---------- Superseding RST-04720R (April 2002)

RESERVE SUPPORT TEAM GUIDE SPECIFICATIONS

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SECTION 04720

CAST STONE
03/03

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NOTE: This guide specification covers the requirements for cast stone.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change to the guide specification.

RST-04720R is a Louisville District Army Reserve Support Team (RST) specification. Refer all specification comments to the RST.

The listed references should not be manually edited except to add new references. References not used in the text will be deleted from this paragraph during the SpecsIntact reference reconciliation process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACI INTERNATIONAL (ACI)

ACI 318/318R (Current Issue) Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 82	(1997a) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A 615	(2001a) Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete reinforcement
ASTM C 33	(2002a) Standard Specification for Concrete Aggregates
ASTM C 150	(2002) Standard Specification for Portland Cement
ASTM C 173	(2001) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(1997) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2001) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 270	(2001a) Standard Specification for Mortar for Unit Masonry
ASTM C 494	(1999a) Standard Specification for Chemical Admixtures for Concrete
ASTM C 618	(2001) Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland cement Concrete
ASTM C 642	(1997) Standard Test Method for Specific Gravity, Absorption, and Voids in Hardened Concrete
ASTM C 666	(1997) Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C 979	(1999) Standard Specification for Pigments for Integrally colored concrete
ASTM C 989	1999) Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and mortars.

ASTM C 1194	(1991(1995))Standard Test Method for Compressive Strength of Architectural Cast Stone
ASTM C 1195	(1991(1995)) Standard Test Method for Absorption of Architectural Cast Stone
ASTM C 1364	(1997) Standard Specification for Architectural Cast Stone
ASTM D 2244	(1993(2000)) Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates

(Current Issue) CAST STONE INSTITUTE

CSITM	Cast Stone Institute Technical Manual

1.2 SECTION INCLUDES - ARCHITECTURAL CAST STONE

Scope - All labor, materials and equipment to provide the cast stone shown on architectural drawings and as described in this specification.

1. Manufacturer shall furnish cast stone covered by this specification.

2. Installing contractor shall unload, store, furnish all anchors, set, patch, clean and seal (optional) the cast stone as required.

1.3 RELATED SECTIONS

Section 01330 Submittals
Section 04200 Unit Masonry
Section 07900 Joint Sealers

1.4 DEFINITIONS

Cast Stone - an architectural precast concrete building unit intended to simulate natural cut stone

1. Dry Cast Concrete Products - manufactured from zero slump concrete
   a. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero-slump concrete against a rigid mould until it is densely compacted

2. West Cast Concrete Products - manufactured from measurable slump concrete
   a. Wet Cast Method: manufactured from measurable slump concrete and vibrated into a mould until it becomes densely consolidated

1.5 SUBMITTALS

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NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

Place a "G" within submittal tags following a submittal item if Government approval for that item is required. Government approval should be required only for items deemed sufficiently critical, complex, or aesthetically significant to merit such action.

For submittals requiring Government approval, a code of up to three characters within submittal tags may be used following the "G" designation to indicate the approving authority.

Submittal items not designated with a "G" are considered as being for information only.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittal

Manufacturer's Qualifications; [___]

SD-02 Shop Drawings

Manufacturer's Shop Drawings; [___]

Submit manufacturer's shop drawings including profiles, cross section, reinforcement, exposed faces, arrangement of joints (optional for standard or semi-custom installations), anchoring methods, anchors (if required), annotation of stone types and their location.

SD-3 Product Data

Acceptable Manufacturer Products; [___]

Manufacturers products listed in this specification are referenced to establish a standard of quality. When the specific product listed is submitted by the Contractor, that submittal will be considered For Information Only. When an equal to that named in this specification is submitted, it shall be for Government

Approval (g). The following manufacturer products are specifically mentioned in this specification:

RockCast
4600 Devitt Drive
Cincinnati, Ohio 45246
800-482-6466
www.rockcast.com

SD-04 Samples

Cast Stone; [___]

Submit pieces of the cast stone that are representative of the general range of finish and color proposed to be furnished for the project.

SD-6 Test Reports

Cast Stone; [___]

Submit manufacturer's test results of cast stone previously made by the manufacturer

1.6 QUALITY ASSURANCE

1.6.1 Manufacturer's Qualifications

Manufacturer shall have sufficient plant facilities to produce the shapes, quantities and size of cast stone required in accordance with the project schedule.

Manufacturer shall submit a written list of projects similar in scope and at least three (3) years of age, along with owner, architect and contractor references

1.6.2 Standards

Comply with the requirements of the Cast Stone Instituted Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.

1.6.3 Mock-up (Optional)

Provide full size unit(s) for use in construction of sample wall. The approved mock-up shall become the standard for appearance and workmanship for the project.

PART 2 PRODUCTS

2.1 ARCHITECTURAL CAST STONE

2.1.1 Physical Properties

Project the following:

1. Compressive Strength - ASTM C 1194: 6,500 psi (45 Mpa) minimum for products at 28 days.

2. Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days.

3. Air Content - ASTM C 173 or ASTM C 231, for wet cast product shall be 4-6% for units used in a freeze-thaw environment.

2.1.2 Job Site Testing

One (1) sample from production units may be selected at random from the filed for each (500 cubic feet) 14 m3 delivered to the job site.

1. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 80% of design strength or as allowed by ACI 318.

2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.

3. Field specimens shall be tested in accordance with ASTM C 1194 and ASTM C 1195.

2.2 RAW MATERIALS

A. Portland cement - Type I or Type III, white and/or grey, ASTM C 150.

B. Coarse aggregates - Granite, quartz or limestone, ASTM C 33, except for gradation, and are optional for the VDT casting method.

C. Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.

D. Colors - Inorganic iron oxide pigments, ASTM C 979, except that carbon black pigments shall not be used.

E. Admixtures - Comply with the following:

1. ASTM C 260 for air-entraining admixtures.
2. ASTM C 494 for water reducing, retarding or accelerating admixtures.
3. Other admixtures: integral water repellents and other chemicals for which no ASTM standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
4. ASTM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
5. ASTM C 989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these features.

F. Water - Potable

G. Reinforcing bars:

1. ASTM A 615/A 615M. Galvanized or epoxy coated when cover is less than (1-1/2 inches) 37 mm.
2. Welded Wire Fabric: ASTM A 82 where applicable for wet cast units.

H. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

2.3 COLOR AND FINISH

A. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of (1/32 in) 0.8 mm and the density of such voids shall be less than 3 occurrences per any (1-square inch) 25 mm2 and not obvious under direct daylight illumination at a (5-feet) 1.5 m distance.

B. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a (10-feet) 3 m distance.

1. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.

a. Total color difference - not greater than 6 units.
b. Total hue difference - not greater than 2 units.

C. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a (20-foot) 6 m distance.

2.4 REINFORCING

A. Reinforce the units as required by the drawings and for safe handling and structural stress.

B. Minimum reinforcing shall be 0.25 percent of the cross section area.

C. Panels, soffits and similar stones greater than (12 inches) 300 mm wide shall be reinforced along their length and width.

D. Welded wire fabric reinforcing shall not be used in dry cast products.

2.5 CURING

A. Cure units in a warm curing chamber at 95 percent relative humidity for approximately 18 hours, or yard cure for 350 degree-days (i.e. 7 days @ (50 degrees F) 10 degrees C or 5 days @ (70 degrees F) 21 degrees C prior to shipping.

B. Remove cement film from exposed surfaces prior to packaging for

shipment.

2.6 MANUFACTURING TOLERANCES

A. Cross section dimensions shall not deviate by more than plus or minus (1/8 inch) 3 mm from approved dimensions.

B. Length of units shall not deviate by more than length/360 or plus or minus (1/8 inch) 3 mm, whichever is greater, not to exceed plus or minus (1/4 inch) 6 mm.

1. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.

C. Warp, bow or twist of units shall not exceed length/360 or plus or minus (1/8 inch) 3 mm, whichever is greater

D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features - On formed sides of units, (1/8 inch) 3 mm, on unformed sides of unit, (3/8 inch) 9 mm maximum deviation.

2.7 PRODUCTION QUALITY CONTROL

Testing

1. Test compressive strength and absorption from specimens selected at random from plant production.
2. Samples shall be taken from every (500 cubic feet) 14m2 of product produced.
3. Perform tests in accordance with ASTM C 1194 and ASTM C 1195.
4. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.

2.8 DELIVERY, STORAGE AND HANDLING

A. Mark production units with the identification marks as shown on the shop drawings.

B. Package units and protect them from staining or damage during shipping and storage.

C. Provide an itemized list of products to support the bill of lading.

PART 3 EXECUTION

3.1 EXAMINATION

Installing contractor shall check cast stone materials for fit and finish prior to installation. Do not set unacceptable units.

3.2 SETTING TOLERANCES

A. Comply with Cast Stone Institute Technical Manual

B. Set stones (1/8 inch) 3 mm or less, within the plane of adjacent units.

C. Joints, plus (1/16 inch) 1.5 mm, minus (1/8 inch) 3 mm.

3.3 JOINTING

3.3.1 Joint Size

1. At stone/brick joints (3/8 inch) 9.5 cm.
2. At stone/stone joints in vertical position - [(1/4-inch) 6 mm] [(3/8 inch) 9.5mm)]
3. Stone/stone joints exposed on top (3/8 inch) 9.5 mm.

3.3.2 Joint materials

1. Mortar, Type N, ASTM C 270.
2. Use a full bed of mortar at all bed joints.
3. Flush vertical joints full with mortar.
4. Leave all joints with exposed tops or under relieving angles open for sealant.
5. Leave head joints in copings and projecting components open for sealant.

3.3.3 Location of joints

1. As shown on shop drawings.
2. At control and expansion joints unless otherwise shown.

3.4 SETTING

A. Drench units with clean water prior to setting.

B. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

C. Set units in full bed of mortar, unless otherwise detailed.

D. Rake mortar joints (3/4 inch) 18 mm for pointing.

E. Remove excess mortar from unit faces immediately after setting.

F. Tuck point unit joints to a slight concave profile.

3.5 JOINT SEALANT

A. Comply with requirements of Section 07900.

B. Prime ends of units, insert properly sized backing rod and install required sealant.

3.6 REPAIR AND CLEANING

A. Repair chips with touchup materials furnished by manufacturer.

B. Saturate units to be cleaned prior to applying an approved masonry cleaner.

C. Consult with manufacturer for appropriate cleaners.

3.7 INSPECTION AND ACCEPTANCE

A. Inspect finished installation according to Bulletin #36.

B. Do not field apply water repellant until repair, cleaning, inspection and acceptance is completed.

-- End of Section --